DOCUMENT RESUME

ED 079 417 TM 003 021

AUTHOR	Meissner, Judith A.; Shipman, Virginia C.
TITLE	Disadvantaged Children and Their First School Experiences. ETS-Head Start Longitudinal Study: Structural Stability and Change in the Test Performance of Urban Preschool Children. Summary Report.
INSTITUTION	Educational Testing Service, Princeton, N.J.
SPONS AGENCY	Office of Child Development (DHEW), Washington, D. C. Bureau of Head Start and Child Service Programs.
REPORT NO	ETS-PR-73-8
PUB DATE	Mar 73
NOTE	20p.
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	*Age Differences; Cognitive Ability; *Cognitive Development; Conceptual Tempo; *Disadvantaged Youth; Longitudinal Studies; *Performance Tests; Preschool Children; Reaction Time; Technical Reports
IDENTIFIERS	Project Head Start

ABSTRACT

The project report summarized here describes the interrelationships of the individually administered tests given to 820 Head Start children from three urban sites in the second year of a longitudinal study. These results are compared with those obtained in Year 1, the year prior to the students' attendance in a group program. The tests tapped cognitive skills (e.g., general knowledge, verbal and perceptual-motor abilities, reasoning skills, Piagetian-based conservation development), cognitive styles (e.g., analytic abilities, reflection-impulsivity), and a variety of personal and social behaviors (e.g., risk-taking, cooperation, self-concept, and play preference). In both years, analyses of the test data yielded two main dimensions: (1) a general ability dimension, and (2) a response tempo dimension. Some task-specific styles and behaviors were also defined. Year 2 analyses also revealed a spontaneous verbalization factor unrelated to the major verbal competency measure. In addition, there was some evidence in Year 2 for generalization of specific personal and social behaviors (compliance and the desire to please) across tasks. Both economic eligibility and later selection for Head Start were associated with cognitive performance differences in Year 1, and significant differences remained in Year 2. High similarity in the factor structure across years was shown. (Author/KM)

ED 079417

FILMED FROM BEST AVAILABLE COPY

PR-73-8

DISADVANTAGED CHILDREN AND THEIR FIRST SCHOOL EXPERIENCES

ETS-Head Start Longitudinal Study

Summary Report

Structural Stability and Change in the Test Performance of Urban Preschool Children

Judith A. Meissner
Virginia C. Shipman

March 1973

EDUCATIONAL TESTING SERVICE
PRINCETON, NEW JERSEY

ED 079417

PR-73-8

Summary Report

DISADVANTAGED CHILDREN AND THEIR FIRST SCHOOL EXPERIENCES

ETS-Head Start Longitudinal Study

Structural Stability and Change in the Test Performance of Urban Preschool Children

Judith A. Meissner
Virginia C. Shipman

Report Under
Grant Number H-8256

Prepared for: Project Head Start
Office of Child Development
U. S. Department of Health,
Education, and Welfare

March 1973

Acknowledgements

The writers wish to express appreciation to Walter Emmerich, Robert Linn and William Ward for reviewing this report, providing thoughtful and constructive criticism throughout, and for their support and counsel throughout the study.

Particular thanks go to John Barone who coordinated data analysis activities and to Norma Hvasta, Judith Ohls and Emily White who programmed the analyses summarized herein; thanks, too, are due the women who painstakingly coded all the data under the able supervision of Joan Tyson.

Appreciation is also expressed to Thelma Benton for her care and speed in typing the several drafts and final copy, and to Susan Simosko for her valuable suggestions and assistance in careful proofing and editing of this report.

Special thanks must also be extended to all those field personnel who enabled us to gather reliable data. Without their continued hard work, enthusiasm and involvement, a study of this sort would not have been possible.

Deepest gratitude, however, goes to the children and their families who participated in the study. Together we hope to contribute to a better understanding of the young child's development.

Judith A. Meissner
Virginia C. Shipman

Princeton, New Jersey
March 16, 1973

Summary Report

"Structural Stability and Change in the Test Performance of Urban Preschool Children"

Introduction

In the spring of 1967, the Head Start Research Office and Educational Testing Service began planning a large-scale study of the cognitive, personal and social development of about 2,000 economically disadvantaged children who were to be studied from their fourth through their eighth year. This age range was chosen because it is during this time when many abilities consolidate and the child makes the social transition from familiar home surroundings to the world of school, peers, and unfamiliar adults. The overall aims of the ETS-Head Start Longitudinal Study were to identify the components of early education associated with children's development, determine the family background and other environmental factors that influence such associations, and to describe, if possible, how these influences operate. Project Report 68-4, "Theoretical Considerations and Measurement Strategies" (Educational Testing Service, 1968) offers a detailed description of the rationale and measurement aspects of the study.

Previous reports have described characteristics of the initial sample (ETS, 1970), data collection procedures during the first two years of the study (ETS, 1969; ETS, 1970), the interrelationships among the cognitive, perceptual, affective and social behaviors sampled in the Year 1 testing (Shipman, 1971), the relationship of demographic indexes of socioeconomic status to maternal behaviors and attitudes reported in the initial home interview (Shipman, 1972a), and the structure and development of personal and social behaviors in preschool settings (Emmerich, 1971).

The project report summarized here, "Structural Stability and Change in the Test Performance of Urban Preschool Children" (Shipman, 1972b) describes the interrelationships of the individually-administered tests given to children from the three urban sites* in the second year of the study, the Head Start or preschool year for most of the children, and compares these results with those obtained in Year 1, the year prior to their attendance in a group program. The major questions asked in this report concern amount of similarity of interrelationships among variables in Years 1 and 2, extent to which perceptual-cognitive processes are differentiated in the two years, relationship between cognitive styles and children's abilities, and the degree to which these findings are related to age, sex or social class groupings. In addition to contributing to the understanding of the young child and his development, the answers to these questions have obvious importance as a framework for interpreting findings obtained in other assessment situations and in evaluation studies. If interrelationships among variables remain highly similar over years and within subgroups, this outcome gives some indication that a stable and generalizable underlying construct is involved and enables any changes in mean level of scores associated with preschool experience or family influences to be interpreted with greater confidence.

Sample

Four regionally-distinct communities were selected which 1) had a sufficient number of children in school and in the Head Start program, 2) appeared feasible for longitudinal study given expressed community and school cooperation and expected mobility rates and 3) offered variation in

*The fourth site, Lee County, Alabama, was excluded from these analyses since only a subset of the tests were administered there in Year 2.

preschool and primary grade experiences. These four sites were Lee County, Alabama; Portland, Oregon; St. Louis, Missouri; and Trenton, New Jersey. In the initial testing and data collection in the target school districts, an attempt was made to include all children of approximately 3 1/2 to 4 1/2 years of age, with the exclusion of children whose primary language was not English or who had severe physical handicaps. For a more complete description of this population, the reader is referred to Project Report 71-19 (Shipman, 1971).

Following household canvassing and parent interviews, the first test data were collected in the spring and summer of 1969 on over 1800 children, the majority falling between the ages of 3 years 9 months and 4 years 8 months. All these children were scheduled to be enrolled in first grade in the target school districts in the fall of 1971. These tests, supplemented by additional measures, were readministered in the spring of 1970. The only rural site of the sample, Lee County, Alabama, did not have a pre-kindergarten Head Start program, so only a limited test battery was given there in Year 2, and the site was excluded from the Year 1-Year 2 comparisons. There were 820 children from the remaining three-site sample who were administered one or more tests in both Year 1 and Year 2 of the study, and it is on these 820 longitudinal subjects that the final comparisons were made. Of the three urban sites comprising the final longitudinal sample, Portland contributed the largest number of children (50.2%) to the study, followed by Trenton (33.4%) and St. Louis (16.4%). Overall, there were slightly more boys than girls (52.9% and 47.1%, respectively, and three times as many blacks as whites. In the second year of the study, a little less than half the children (47.2%) attended Head Start, 14.3%

attended other preschool programs, and about a third (38.5%) were not known to have attended either Head Start or other preschool programs. Of the 387 children who attended Head Start, 330 were black, indicating that the Head Start groups sampled were essentially black programs. The other preschool and no known preschool groups each contained about twice as many blacks as whites (80 blacks and 37 white children attending other preschools; 205 blacks and 111 whites not known to attend preschool). Data on mothers' amount of schooling, used as a rough measure of SES, showed the mothers of the Head Start children to have almost two years less schooling than mothers of children in the no known preschool category. Also, the white children's mothers had about a year and a quarter more schooling than did the mothers of the black children.

Measures

The individual tests administered tapped cognitive skills (e.g., general knowledge, verbal and perceptual-motor abilities, reasoning skills, Piagetian-based conservation development), cognitive styles (e.g., analytic abilities, reflection-impulsivity), and a variety of personal and social behaviors (e.g., risk-taking, cooperation, self concept and play preference measures). These tests are listed in Table 1. This battery of tests was administered to each child in a four-day testing sequence, usually of 1 1/2 hours duration daily. Other information obtained in Years 1 and 2, but not included in this report, concerned family background and other environmental variables from a 90-minute interview with the child's mother or mother-surrogate, in the home in Year 1 and at the testing center in Year 2, a set of mother-child interaction tasks in both years, and a group of classroom observation schedules and teacher-child inventories in Year 2 of the study.

Table 1

Child Measures Used in ETS-Head Start Longitudinal Study in 1969 and 1970 (Year 1 and Year 2)

Measure	Year 1 Age 3 1/2-4 1/2	Year 2 Age 4 1/2-5
General Knowledge		
Preschool Inventory (Caldwell)	X	X
TAMA General Knowledge Test	X	X
Verbal		
ETS Story Sequence Tasks	X	X
ETS Matched Pictures Language Comprehension Task	X	X
Massad Mimicry Test	X	X
ETS Adaptation of Peabody Picture Vocabulary Test	X	X
Reasoning and Analytic Styles		
Preschool Embedded Figures Test	X	X
Picture Completion (WPPSI)	X	
Hess and Shipman Toy Sorting Task	X	
Hess and Shipman Eight-Block Sorting Task	X	X
Sigel Object Categorization Test	X	X
Piagetian		
Boy-Girl Identity Task	X	X
ETS Enumeration	X	X
Spontaneous Numerical Correspondence	X	X
ETS Spatial Egocentrism Task		X
Attention, Learning, Memory		
Fixation Time	X	X
Relevant Redundant Cue Concept Task		X
Stanford Memory Test		X
Creativity		
Naming Category Instances Task		X
Perception		
Children's Auditory Discrimination Inventory	X	X

Table 1 (continued)

Child Measures Used in ETS-Head Start Longitudinal Study
in 1969 and 1970 (Year 1 and Year 2)

Measure	Year 1 Age 3 1/2-4 1/2	Year 2 Age 4 1/2-5
Perception (continued)		
Form Reproduction		
Beery Test	X	X
Geometric Forms (WPPSI)		X
Johns Hopkins Perceptual Test	X	X
Seguin Form Board	X	X
General Personality		
*Personality Observations (during preschool free play)		X
*Child Cooperation (used with all mother-child interaction measures)	X	X
Social/Academic Motives		
Gumpgookies		X
Hess and Shipman Etch-a-Sketch Interaction Task	X	
Open Field Test	X	X
Attitudes, Interests		
Brown IDS Self-Concept Referents Test	X	X
Social Schemata		X
Controlling Mechanisms		
Matching Familiar Figures Test	X	X
Mischel Technique	X	X
*Modified Hertzig Procedure	X	X
Motor Inhibition Test	X	X
Risk Taking	X	X
Vigor Measure	X	X

*Measure demands no time of subject.

Note. - Descriptions and Year 1 data for the individual tasks given in Year 1 can be found in PR-71-19 (Shipman, 1971), and comparative information for Year 1-Year 2 on many of the tasks is contained in the technical report series (Shipman, 1972c).

Data Collection*

Based on the notion that to gather reliable data successfully it is essential to have community support and input, the study hired local women as interviewers, classroom observers and testers. Local coordinators were responsible for the initial screening of all local project personnel and day-by-day management of project operations during initial interviewing and during the months of training and testing. In Year 2 local technical consultants were also hired to assist the coordinator in a variety of functions and to monitor data collection activities.

The first stage of data collection consisted of household canvassing and parent interviews, both of which were conducted by the New York City firm, Audits and Surveys, which was subcontracted to locate all eligible children within the geographic areas studied and to have local interviewers complete a 90-minute interview with each child's mother or mother-surrogate. Following parent interviews, tester training and other preparations for administration of the tests ensued. The local testers, all of whom were female and most of whom were black, were selected primarily on the basis of their showing positive affective reactions to young children and their ability to learn standardized administration of the tasks. These criteria were believed to be more important than were the traditionally-required educational credentials. Intensive on-site training of the testers was undertaken by several tester trainers sent to each site from the Princeton office. Similar training and testing procedures were followed during both the first and second year of operations. With the advantage

*For a more detailed description of data collection than that which follows in this necessarily brief review, the reader is referred to Project Reports 69-12 (ETS, 1969) and 71-19 (Shipman, 1971).

of a year's experience, however, activities were considerably smoother and more efficient in Year 2.

Data Processing

All scoring and coding of the data was done at the Princeton office. Typically, data were coded by one person, checked in detail by a second, then spot-checked by a third person prior to keypunching. When appropriate, a reliability check was made by having a small portion of the data coded independently by two coders.

Results

Year 1*

When the data from the Year 1 test battery were analyzed, one main competence-related factor, that of general information-processing skills (also referred to as "g"), was found to be underlying most of the tests. The Preschool Inventory, measuring achievement in areas regarded as critical for successful kindergarten performance, showed the highest amount of these information-processing skills. Tests involving receptive vocabulary (Peabody Picture Vocabulary Test), understanding of time and spatial sequences (ETS Story Sequence), skill in classifying objects (Sigel Categorizing Test and the Eight-Block Sorting Task), and auditory or visual discrimination (Children's Auditory Discrimination Inventory, Johns Hopkins Perceptual Test, Matching Familiar Figures, Seguin Form Board, Form Reproduction, and Preschool Embedded Figures Test) also loaded heavily on "g". Children who are at ease in the testing situation, pay attention, are persistent, and are able to understand and follow directions tend to do

*See Shipman (1971) for a more complete description of the Year 1 analyses.

well on tests, and these abilities are also included in the "g" factor. The child's self-concept score from the Brown Self-Concept Test and his cooperation rating during the mother-child interaction tasks were also related to the general ability factor. Thus, this factor seems to be indicative of an overall competence on the part of the child, a general ability to cope with his environment.

A second general factor that emerged from these data concerned the child's speed of response. Some children responded in a very quick manner to the three tests in which time to first response measures were obtained (Sigel Object Categorization, Matching Familiar Figures, and Preschool Embedded Figures), while others responded more slowly. Response time was not related to how well the child performed on the tests, however. The correlation between this speed of response factor and the information-processing factor was essentially zero.

The test battery did not include enough measures specifically designed to tap personal-social behaviors to delineate factors in the affective and social domains. Given the present "state of the art" in valid measurement of these variables for this age, however, it is doubtful that other results would be obtained with more extensive measurement in standardized test-like settings.

Results by sex, age and SES subgroups showed the same pattern of relationships among the variables as had the analysis for Year 1 subjects. It was found that mother's education, occupation of head of household, family economic eligibility for Head Start, and child's age were correlated significantly with the general information-processing factor. The older and higher SES children had a higher level of information-processing

skills, conceptual understandings and favorable responses to the testing situation. The SES effects tended to be much larger than those of age. Sex differences on tasks defining the information-processing factor were few and negligible. The one variable on which large sex differences were obtained was that of risk-taking, with boys more willing to take risks. The group of children who were economically eligible for Head Start and who later did attend Head Start performed significantly less well on a variety of cognitive-perceptual tasks in Year 1 (prior to their enrollment in Head Start) than did the children who were ineligible for Head Start and who later attended other preschool programs.

Year 2

In Year 2, a major information-processing factor again accounted for most of the correlations among tasks. The tests best defining this factor were the Preschool Inventory and the Peabody Picture Vocabulary Test. As in Year 1, a variety of other cognitive skills were also represented, and were somewhat more strongly related (i.e., had higher loadings) in Year 2. In contrast to Year 1, however, perceptual tasks had somewhat lower rank orderings on the "g" factor in Year 2. These perceptual tasks seemed to show an ordering of complexity, with form discrimination tasks (Matching Familiar Figures, Johns Hopkins Perceptual Test) being the easiest and tasks requiring analysis and copying skills (Preschool Embedded Figures Test, Form Reproduction) being the most difficult. Thus, in Year 2, more complex perceptual abilities responsible for performance on particular tasks may have been emerging.

A second factor consisted of measures of spontaneous verbalizations, including number of items elaborated upon in the Preschool Inventory and

spontaneous talk with the tester and with oneself in the Open Field situation. These measures appeared to be tapping personal-social behaviors such as the child's ease in the testing situation or need to relate rather than verbal competency, and may be related to one of Vygotsky's (1962) earlier stages in the child's internalization of speech.

Although a third factor was defined by two of the three response tempo scores (Sigel and Preschool Embedded Figures Test), the response tempo score on the third test (Matching Familiar Figures) defined a separate factor. This split of the latency scores may reflect an emerging differentiation of speed and cognitive style factors.

In Year 2, there was evidence that some of the personal and social behaviors assessed were generalizing across tasks and becoming more differentiated, since several measures reflecting the child's compliance to social expectations defined a factor.

As was obtained for the Year 1 data, mother's education, occupation of the head of the household, and economic eligibility for Head Start were significantly related to the general information-processing factor, but sex and age of the child were not. Later attendance in Head Start, as opposed to that of other preschool programs, correlated negatively with this factor, indicating a continuing significant difference in mean level performance for these two groups, but it must be remembered that preschool and Head Start attendance is confounded with SES and other demographic variables that prohibit simple Head Start-non Head Start comparisons.

Subgroup Comparisons

Of those children economically eligible for Head Start, it was questioned to what extent those who did attend Head Start showed a different

structure of abilities than those who did not attend a preschool program. Since the majority of the Head Start children in this study were black, the question was asked of the black sample only. Using a factor matching procedure which compared factor structures in Year 1 and Year 2, the pattern of cognitive and perceptual performances was found to be highly similar for these two groups, both before and during preschool intervention (with the coefficient of congruence between the first factor being .90 for Year 1 and .94 for Year 2).

Comparisons also were made of the pattern of interrelationships among variables obtained for subgroups varying in socioeconomic status as measured by amount of mother's schooling. Subjects were divided into three groups: those whose mothers had completed less than ten years of schooling; those whose mothers had completed at least ten but no more than twelve years of schooling; and those with more than twelve years of schooling. Coefficients of congruence for "g" between pairs of these three SES groups for Year 1 and Year 2 ranged from .94 to .98, indicating that, for this sample, differences in SES were not associated with differences in the pattern of cognitive-perceptual performances.

Year 1-Year 2 Comparisons

The pattern of interrelationships among cognitive-perceptual measures was highly stable across years, and there was continued lack of clearly differentiated clustering of tasks according to verbal, perceptual and quantitative breakdowns. The unitary organization of information-processing skills appeared to be even stronger in Year 2, since the cognitive-perceptual tasks had higher loadings in that year.

Although the general information-processing factor and the response speed factor were highly stable across years, performance on tasks such as risk-taking and delayed gratification which tapped personal-social behaviors was highly specific in both years and showed low stability across years. In contrast to those behaviors sampled on the main competence factor, these behaviors appeared to be highly affected by situational determinants.

Several factor matching techniques were used to test the similarity of the factor structures obtained in the two years, and with both techniques (Year 2 data rotated to the 13-factor Varimax solution for the Year 1 data as a target matrix, and rotating the Year 1 and Year 2 data to simple structure) the factor structures were found to be highly similar across years (with Year 1-Year 2 coefficients of congruence of .97 for the target matrix procedure and .93 for simple structure). Sequential block factor analyses were performed mainly to investigate the extent and nature of change in factor structure over time in the longitudinal sample. After the first 13 Year 1 factors were partialled out of the Year 2 scores, the residual matrix showed results similar to those obtained for Year 2 (a general cognitive-perceptual dimension, a spontaneous verbalization factor, a perceptual speed factor, and many task-defined factors).

Summary

In both years, analyses of the child test data yielded two main dimensions: 1) a general ability dimension, and 2) a response tempo dimension. There were also some task-specific styles and behaviors defined. These findings were highly consistent despite the analytic procedure being used and across major subject classifications, such as preschool attendance

controlled for eligibility, SES, sex and race within site. The Year 2 analyses also revealed a spontaneous verbalization factor that was not related to the major verbal competency measure. In addition there was some evidence in Year 2 for generalization of specific personal and social behaviors (i.e., compliance and the desire to please) across tasks. Among the major breakdowns within subject groups (i.e., sex, preschool attendance, Head Start economic eligibility, SES, age), in Year 1, age, eligibility and SES correlated only with the general ability factor. In Year 2, where there was a more restricted age range, due to the shorter testing interval in Year 2, only eligibility and SES were correlated with general ability.

Both economic eligibility and later selection for Head Start were associated with cognitive performance differences in Year 1 and significant differences remained in Year 2. Sex differences were negligible.

In investigating the extent of change in the factor structure across years, high structural similarity was shown, particularly among perceptual-cognitive measures, both for the total group and for major subject classifications. This finding would suggest that behaviors were being tapped at the beginning of a period of integration rather than during a period of differentiation. There did appear, however, some change in the meaning of "g" with age, with perceptual tasks in Year 2 becoming less relevant for describing individual differences in cognition.

Several other studies (e.g., Meyers, Dingman, Orpet, Sitkei & Watts, 1964; Stott & Ball, 1965) have factor analyzed test batteries given to preschool children and, in addition to the general ability factor, have found verbal, perceptual and numerical factors which did not emerge in the present study. Although these studies may have included a more

differentiated test battery, in contrast to the present study all these other studies used middle-class subjects primarily, and it might be the case that differentiation of information-processing skills into verbal and performance subcategories requires more varied environmental experiences which may be lacking in low-income homes. It should be noted that the SES variation evidenced in the present sample still represents a restricted and primarily low status level. The slight change in the meaning of "g" with age in Year 2 of the Longitudinal Study affords some tentative evidence that differentiated factors may appear in future years of this study.

The tasks that did not relate to general ability showed little or no consistency in performance across years. This may be due to young children's test performance being somewhat unstable as a function of their greater susceptibility to situational factors, and is likely to be most marked for the children in this sample, since at the time of initial testing they had no prior preschool or testing experience. For the developmentally less mature subjects, environmental and developmental differences may have increased individual differences obtained in Year 2. Thus, although the pattern of interrelationships among tasks remained highly similar across years in each of the major subject breakdowns, changes in mean level of performance may not have.

Future analyses will investigate these relationships controlling for age at time of initial testing and time interval between Year 1 and Year 2 testing. The present findings will aid the interpretation of these future results, since the similarity of factor structures found here indicates that the scores have similar meaning in the various subgroups at each of the two times. Therefore, any mean differences are directly interpretable as changes in level on the same trait or construct.

References

Educational Testing Service. Disadvantaged children and their first school experiences: Theoretical considerations and measurement strategies. Princeton, N.J.: ETS, December 1968, PR-68-4. Prepared under OEO Contract 4206 and OEO Grant CG-8256.

Educational Testing Service. Disadvantaged children and their first school experiences: From theory to operations. Princeton, N.J.: ETS, August 1969, PR-69-12 (2 Vols.). Prepared under Grant H-8256, Department of Health, Education, and Welfare.

Educational Testing Service. Disadvantaged children and their first school experiences: The sample: operations in the Head Start year. Princeton, N.J.: ETS, February 1970, PR-70-2. Prepared under Grant H-8256, Department of Health, Education, and Welfare.

Educational Testing Service. Disadvantaged children and their first school experiences: Preliminary description of the initial sample prior to school enrollment. Princeton, N.J.: ETS, August 1970, PR-70-20 (2 Vols.). Prepared under Grant CG-8256, Department of Health, Education, and Welfare.

Educational Testing Service. Disadvantaged children and their first school experiences: Preliminary description of the initial sample prior to school enrollment. Princeton, N.J.: ETS, July 1971, Summary Report. Prepared under Grant CG-8256, Department of Health, Education, and Welfare.

Emmerich, W. Disadvantaged children and their first school experiences: Structure and development of personal-social behaviors in preschool settings. Princeton, N.J.: Educational Testing Service, 1971, PR-71-20. Prepared under Grant H-8256, Department of Health, Education and Welfare.

Meyers, C. E., Dingman, H. F., Orpet, R. E., Sitkei, E. G. and Watts, C. A. Four ability-factor hypotheses at three preliterate levels in normal and retarded children. Monographs of the Society for Research in Child Development, 1964, 29 (5).

Shipman, V. C. Disadvantaged children and their first school experiences: Structure and development of cognitive competencies and styles prior to school entry. Princeton, N.J.: Educational Testing Service, 1971, PR-71-19. Prepared under Grant H-8256, Department of Health, Education, and Welfare.

Shipman, V. C. Disadvantaged children and their first school experiences: Demographic indexes of socioeconomic status and maternal behaviors and attitudes. Princeton, N.J.: Educational Testing Service, 1972, PR-72-13. Prepared under Grant H-8256, Department of Health, Education, and Welfare. (a)

Shipman, V. C. Disadvantaged children and their first school experiences: Structural stability and change in the test performance of urban preschool children. Princeton, N.J.: Educational Testing Service, 1972, PR-72-18. Prepared under Grant H-8256, Department of Health, Education, and Welfare. (b)

Shipman, V. C. Disadvantaged children and their first school experiences: Technical report series. Princeton, N.J.: Educational Testing Service, 1972, PR-72-27. Prepared under Grant H-8256, Department of Health, Education, and Welfare. (c)

Stott, L. H. and Ball, R. S. Infant and preschool mental tests: Review and evaluation. Monographs of the Society for Research in Child Development, 1965, 30 (3, Serial No. 101).

Vygotsky, L. S. Thought and language. Cambridge, Mass.: MIT Press, 1962.